PENETRATION OF STEEL ANCHOR INTO A CONCRETE BLOCK – NUMERICAL CONTACT SIMULATION

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Abstract: In the present paper the three-dimensional finite element code, which is developed to study the penetration of a steel anchor into a concrete block, is briefly described. The contact between the anchor, which was assumed to be linear elastic, and the concrete, was solved using the penalty method. The friction between master body (concrete block) and slave body (anchor) is of kinematical type and could be described with the Mohr-Coulomb friction law. At the present stage of computer code development no friction is taken into account. As a constitutive law for concrete, the rate dependent microplane model will be employed (co-rotational formulation). Since in the code the re-meshing strategy had to be used, the mapping of damage variables will be performed by interpolation of their nodal values. It is demonstrated that the solution of the contact problem heavily depends on the finite element discretization of the model.

Key words: Anchor, Concrete, Contact problem, Finite element analysis, Friction, Mesh refinement, Microplane model, Penetration, Rate sensitivity, Remeshing.

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